Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

LIFE ALONG A GRADED RIVER

BY

F. V. EMERSON
University of Missouri

The Missouri River, rising in southwestern Montana, joins the Mississippi a few miles above St. Louis after flowing a distance of about 2,340 miles. In this distance the river falls 4,000 feet, with an average fall of 1.7 feet per mile. For much the greater part of its course the fall is much less. From Great Falls, in Montana, about 2,000 miles from its mouth, the average fall is less than four inches per mile, a fall which decreases down stream until near its mouth the fall is scarcely more than an inch per mile. (Fig. 2.)

The Missouri drains about 527,000 square miles. Much of this drainage area is covered with fine soil. Consequently, the river carries a heavy load of fine sand and silt, a load that is reflected in its Indian name of the "Big Muddy."

With its low grade and heavy load this river in its lower course has ceased to be a degrading stream.* The current in the lower two-thirds of its course rarely, if ever, flows upon a rocky bed, but rather on alluvium often 100 feet in thickness. From Montana to its mouth the present river is essentially a graded stream.† The stream meanders in a steep-sided valley trough from one and one-half to seventeen miles wide, and, except where the river touches the bluffs on either side, the main stream activity consists in reworking its own load, now depositing the load and again picking it up and carrying it a short distance down stream. Owing to the melting of snow in its upper basin and to the spring rains in its lower basin the river is subject to spring floods that often cover the valley bottom from bluff to bluff. During such times, the augmented current works with renewed energy in the soft materials of the flood plain, and changes in the river course are then most frequent. At such times the river frequently changes its channel, forms and destroys bars and islands, and cuts across the spurs projecting into meanders, thus shortening its course.

All these conditions affect in a marked degree the life of the people living on the river flood plain. The "river bottom folks" have special problems which grow out of their physiographic environment. The study of their geographic responses which constitutes the subject of this paper was made during a trip along a short stretch of the river. It embraces the river portions of Carroll, Saline, Chariton, Howard, Cooper, Boone and Moniteau Counties. (Figs. 1 and 3.) The conditions in this stretch of the river are typical of those along the entire graded stretch.

---

* This expression means, in physiography, a stream that reduces or wears down a land surface.

† That is, it no longer very actively builds up or wears down its course.

Navigation. The first response, in chronological order, made to the river was navigation. The river afforded at all times of the year an easy, if treacherous, waterway for canoes and boats of light draught. The flood plain did not become an important land highway, although portions of it were used. The flood plain was often wet and heavily forested while the prairies a few miles back from the river were smooth and generally not in forest. The principal routes, therefore, especially after stage routes were established, were generally on the uplands. As in nearly all settlements of a new area, the hunter and trapper were the first visitors. The names of French origin which nearly every important tributary bears, show the influence of the French explorers. But the French were adventurers or hunters, and they left little permanent imprint on the region. The earlier settlers, and, in fact most of the later ones,

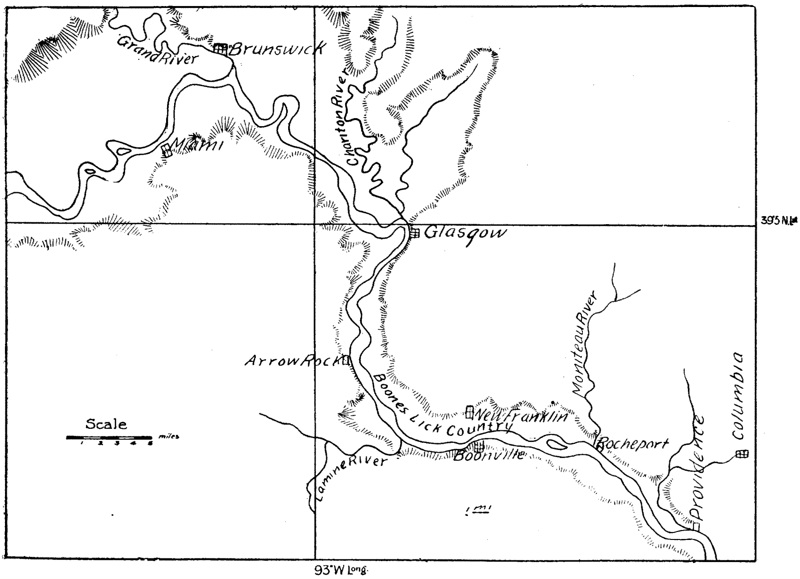

FIG. 1—Map of a part of the Missouri River.

were largely from Kentucky, Tennessee and Virginia. The easy waterway down the Ohio and up the Mississippi and Missouri offered a direct, easy passage to Missouri, whose climate was not unlike that of the home states.

With the advent of the steamboat, about 1819, began a river traffic which expanded to large proportions and declined only when the river was paralleled by railroads. This traffic was of the utmost importance in the settlement of Missouri and of the entire northwest. It early fixed a relatively dense population in a narrow zone along the river. (Figs. 4 and 5.) An interesting outgrowth of this population zone is seen in the educational institutions of Missouri, aside from the Normal Schools, which schools were established relatively recently. (Fig. 6.) Their proximity to, and parallelism with, the river is a striking response to the river influence.

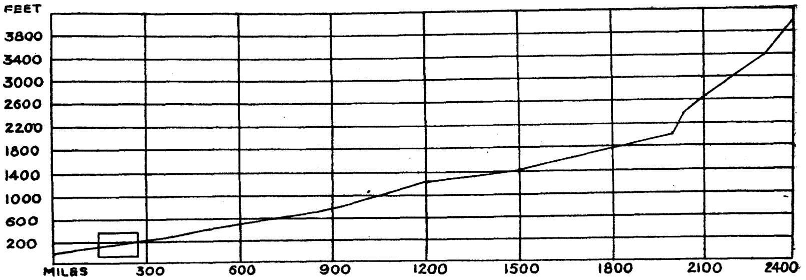

FIG. 2—Profile of the Missouri River from Three Forks, Montana, to its mouth. The square indicates the region described in this paper. From "Profiles of Rivers in the U. S.", by Henry Gannett. *Water Supply and Irrig. Papers*, No. 44, 1901.

The steamboat captain found the Missouri a treacherous and changeable stream, as, indeed, a graded river must necessarily be. Bars and channels shift and the steamer is liable to run into a sand bar. If this happens when the water is falling, the boat may be held for a year or more in the sand until high water will float her off. If the boat sinks, the hull is often filled with fine sand and she cannot be raised or her cargo rescued. Often a shifting of the river channel will leave a sunken boat inland and the cargo and machinery can be dug out. But the accident most feared was collision with sunken logs and stumps, snags, as they are called. In 1819 the *Thomas Jefferson,* carrying a Government exploring party, was the first to be sunk by a snag. During the following seventy-eight years, 193 sunken boats, or 67 per cent. of all wrecks, were due to snags.*

---

*Causes of wrecks in the Missouri River and their number from 1819-1897: Snags, 193; Fire, 25; Ice, 26; Rocks, 11; Explosion of Boiler, 6; Sand bars, 4; Collision with bank, 1; Storms and wind, 2; Collision, 1; Overloading, 1; Swamping in violent eddy, 1; Unknown, 14. From the *Annual Report of the Missouri River Commission, 1897, p. 3870.*

It follows that one of the most important Government activities in improving the river consists in removing these snags. Snag boats patrol the river especially at low water, when the snags can be more easily observed. The snags are either sawed off or torn out. The bottom lands, if undisturbed, are soon covered with a timber growth, as, indeed, are also the enclosing bluffs. Trees, logs and stumps are thus readily taken by the current and become embedded in the sand of the channel, where they are the dreaded snags which no pilot can foresee.

Despite the dangers of navigation, the traffic was profitable. In the days of the north-west fur trade, boats not infrequently cleared $50,000 for their owners in one trip. The river traffic developed in the pilots a remarkable class of men. They knew the entire course with wonderful accuracy. Light-houses were not then established, and at night pilots could infer their position by the reverberations of their whistles from the bluffs on either side. The pilots often received a salary of $300 per month.

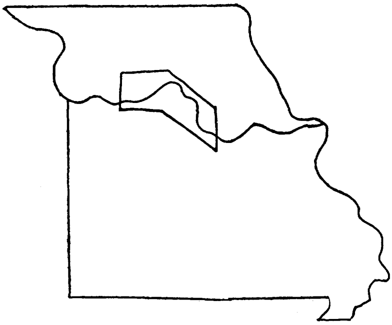

FIG. 3—Shows the area described in this paper.

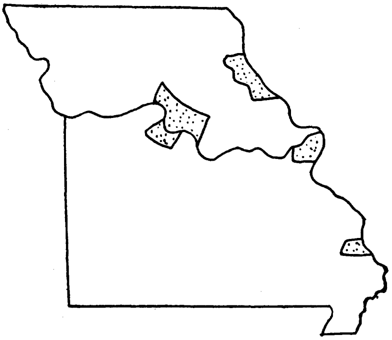

FIG. 4—Population of Missouri in 1830. Dotted areas have density of 10 to 20 per square mile. Density less in the rest of the State.

Settlement. The "Boones Lick Country" (Fig. 1) early drew immigrants. The river in this locality is eroding its southern bank, and has a flood plain between the stream and the northern bluffs two miles or more wide and nearly twenty miles long. Immigrants to central Missouri made this region a resting point from which they could determine their future location.

The river bottom soon became relatively densely settled, but the early settlements did not spread to the adjoining prairies for several reasons. Most of the settlers were used to a wooded country like the bottoms, and believed that prairie lands which would not raise timber must be worthless. It was not for several years that the experiment of wheat growing was tried on the prairies. An enterprising pioneer broke a small patch of prairie and sowed about three pecks of wheat and was astonished at a yield of 20 bushels.

The timber afforded materials for the cabins, and land did not seem worth the trouble unless it must be cleared first. The rushes growing on the wet lands remained green in their lower portions during the winter and afforded pasturage during that season, while the nettles growing on the low bottoms near the river gave fibre from which clothing was made. Moreover, there was constant danger from Indians. The river afforded easy communication in such cases and the prairies were not only at a considerable distance, but were separated from the river bottoms by a belt of maturely eroded country, the "rough country." This "rough country," besides being difficult to traverse, gave opportunities for ambuscades.

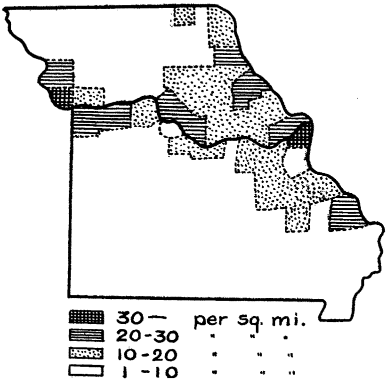

FIG. 5—Density of population in Missouri in 1850.

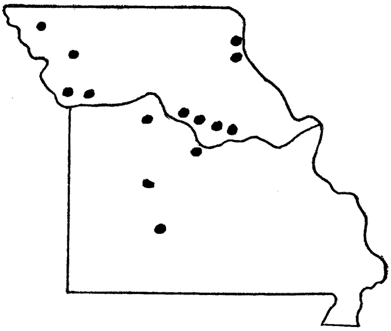

FIG. 6—Location of leading schools in Missouri.

The growth of towns. Naturally, at such a focus of travel as the Boones Lick Country, a town sprang up. In the location of their town the settlers showed their unfamiliarity with the habits of a graded river. Franklin was built in a low portion of the flood plain where the river was narrow and the passage, therefore, was short. (Fig. 7.) The town was laid out in 1817 and at once became a distributing center for a large region, and the seat of a Government land office. Four or five years later a caravan was fitted out for the Santa Fé trade, which soon attained large proportions, and Franklin became the starting point of caravans.

The existence of Franklin, however, was brief. In about nine years, at high floods, the banks began to cave into the river. The settlers had believed that the interlacing tree roots would preserve their lands from the lateral planation of the river. The river continued its encroachment and, in 1832, the citizens abandoned the town. Some moved to the bluff across the river where the town of Boonville was springing up. Others, learning the lesson, moved their goods and often their houses, about two miles back to the bluffs, where they built the town of New Franklin. (Fig. 7.) The site of Old Franklin is now nearly submerged. Other and less important towns along the river were built on the flood plain with the same disastrous results.

Settlements spread rapidly up the river, but were for years largely confined to the flood plain. The narrow strip of flood plain enclosed on one side by the river and the other by the bluffs became nominal geographical units and were often called by the name of some early or prominent settler. For example, the flood plain north of Arrow Rock was called "Cox's Bottom."

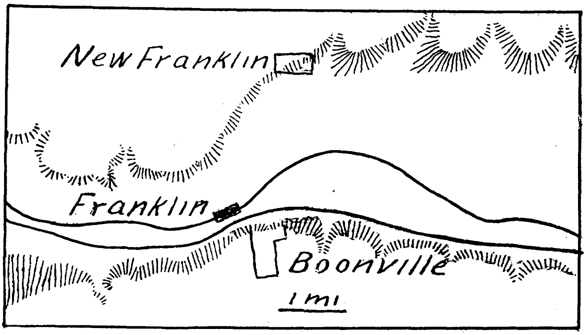

FIG. 7—The neighborhood of Franklin. From the Boonville sheet U. S. Geol. Surv. The site of Franklin is now largely covered by the Missouri.

Towns sprang up along the river. Many were laid out on the flood plains, but were soon abandoned. There was the menace of the fate that befell Franklin, and also the danger and inconvenience from recurrent floods. Moreover, the flood plain dwellers were subject to frequent attacks of malaria, and this alone caused the abandonment of several towns.

From the founding of Franklin in 1817 it required nearly twenty years for the settlers to learn the proper relation between the habits of a graded river and the best location for town sites.

Wherever a meander touches the limiting bluffs of the valley, or the river swings against them, is a favorable town site. A glance at Fig. 1 will show that, almost without exception, the principal towns along the graded portions of the Missouri and Mississippi have this location. The swiftest current in a meander swings against the outer shore of the meander, thus bringing deep water and easy landing for boats near the shore. The bluffs and adjacent higher ground afford easy drainage and sewerage, and are not subject to flooding.

Arrow Rock (Fig. 1) has a favorable location, and a trading post was established there as early as 1807. The location of this post was partly in response to a ferry at that point. The post, however, did not grow to importance. Miami, with its fine location, was the site of an Indian village. It became a prosperous town, and for a time was the terminus of a packet line to St. Louis.

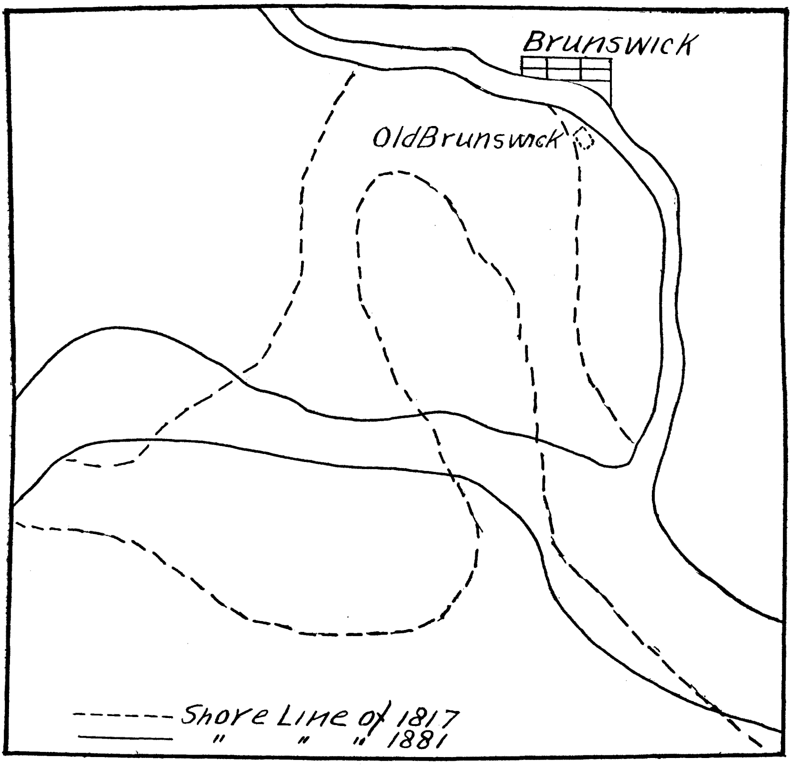

FIG. 8—Showing the Missouri River near Brunswick. From *Rept. on Survey of the Missouri River, Appendix 5, 1881.*

At several points along the valley, not only does the river swing against the bluffs, but at such a point there is an important tributary stream which gave easy access to the country at a considerable distance from the river. Almost invariably a town grew up at such localities. Warehouses were built at Providence at the mouth of the Perche. At the mouth of the Moniteau Creek, trade was brisk as early as 1820. In 1804 the Lewis and Clark expedition camped here. Soon the town of Rocheport was founded and boat-building became an important industry.

The two most important towns in this area were Brunswick and Glasgow. Both were laid out in 1836. Both were preceded by unsuccessful towns which were built with but little regard for physiographic conditions.

Near the site of Glasgow (Fig. 1) the Chariton River enters the Missouri. The Chariton gave access to a fertile back country and its confluence with the Missouri was recognized as an important town site. As early as 1817, the year in which Franklin was founded, the town of Chariton was laid out on the flood plain about two miles above the confluence. While Chariton did not suffer the fate of Franklin of being washed into the river, the site was subject to floods and consequent malaria. It was abandoned in 1829. Thorntonsburg, nearer the confluence, was laid out in 1832, but was soon abandoned. Finally, the proper geographical response was found, and Glasgow was laid out in 1836 on the bluffs about a mile below the confluence of the rivers. The town prospered and became an important point of river traffic, and a distributing center for the Chariton country. It is still a flourishing little city.

Brunswick (Fig. 8), at the mouth of the Grand River, had a similar history. It was first laid out on the flood plain at the foot of the bluffs. Before any considerable growth had taken place, a new town was founded on the bluffs (1836). At that time the Missouri swung northward and joined the Grand at the foot of the bluff on which Brunswick is built. (Fig. 8.) Like Glasgow, Brunswick had a good site and river frontage. It was the distributing center for the Grand River country, and became an important river town.

(*To be concluded.*)